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INFORMATION AND DECISION THEORIES APPLIED TO COLLEGE CHOICE AND PLANNING.

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DESCRIPTORS- PILOT PROJECTS, *EDUCATIONAL GUIDANCE, *CAREER PLANNING, *DECISION MAKING SKILLS, *PROBABILITY, *VALUES, COUNSELOR TRAINING, HIGH SCHOOL STUDENTS, PERSONAL ADJUSTMENT, EDUCATIONAL COUNSELING, SPEECHES,

INFORMATION AND DECISION THEORY OFFERS A COHERENT FRAMEWORK FOR SECONDARY SCHOOL GUIDANCE BECAUSE IT--(1) ESTABLISHES OBJECTIVES, (2) DETERMINES APPROPRIATE PRACTICES, (3) SELECTS AREAS OF RESEARCH, AND (4) EVALUATES PROGRESS TOWARD THESE OBJECTIVES. THE DECISION-MAKING PROGRAM IN THE PALO ALTO, CALIFORNIA SECONDARY SCHOOLS HELPS NINTH AND 11TH GRADE STUDENTS TO DECIDE POST-HIGH SCHOOL PLANS, HIGH SCHOOL ACADEMIC LOADS, AND COLLEGE CHOICES, USING "EXPERIENCE TABLES" WHICH REPORT THE EXPERIENCES OF OTHER STUDENTS. DECISION-MAKING INVOLVES WEIGHING ALTERNATIVES IN TERMS OF DESIRABILITY AND LIKELIHOOD. THE MORE OBVIOUS IMPLICATIONS OF A DECISION-MAKING GUIDANCE FRAMEWORK FOR THE PREPARATION OF SCHOOL COUNSELORS INCLUDE--(1) LESS EMPHASIS ON TRADITIONAL "CLINICAL" TECHNIQUES, (2) MORE EMPHASIS ON TEACHING, THE PRINCIPLES OF LEARNING, AND THE PRINCIPLES OF DECISION THEORY, (3) PERSONAL COUNSELING, (4) KNOWLEDGE OF VOCATIONAL DEVELOPMENT THEORY AND RESEARCH, STATISTICAL INFERENCE AND DATA PROCESSING, AND THE ADULT WORLD "TO BE," (5) A STUDY OF PERSONAL FACTORS, (6) A RE-EMPHASIS ON GROUP GUIDANCE, AND (7) RECOGNITION OF THE NEED FOR IN-SERVICE, TO SUPPLEMENT PRE-SERVICE, TRAINING. THIS PAPER WAS PRESENTED AT THE COLLEGE ENTRANCE EXAMINATION BOARD INVITATIONAL CONFERENCE ON THE PREPARATION OF SCHOOL COUNSELORS (FEBRUARY 23-26, 1966). (WR)

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Information and Decision Theories Applied to College Choice and Planning*

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Introduction

There is an old story about an American frontiersman who had never had any medical instruction, but who decided to try his hand at practicing medicine. When his first patient, a blacksmith who seemed to be very ill indeed with what looked like typhoid fever, demanded some pork and beans, the amateur doctor said "all right" on the theory that he might as well die happily. The blacksmith, however, promptly began to improve, and ultimately recovered; whereupon the "doctor" made the notation: "For typhoid fever prescribe pork and beans."

Somewhat later came another patient, a shoemaker, who seemed to have the same trouble as the blacksmith, but who, on being fed pork and beans, inconsiderately proceeded to die. The undaunted "doctor" then wrote in his notebook: "Pork and beans good for blacksmiths with typhoid fever, but not for shoemakers." All he needed to do, he felt, to discover the remedy for typhoid fever was to continue the process of eliminating the failures.

From Reliable Knowledge
by Harold A. Larrabee (p. 189)

Sometimes our guidance approach to our clients is almost as unsystematic. We often give "advice or counsel" without having the empirical facts or without the research evidence or without even the necessary knowledge. But "if one man's meat is another man's poison, the 'cook' who generalizes too readily is a public menace." (Johnson, 1946, p. 28). Deciding what to do is certainly much easier when you don't have all the facts. You know the saying: "Don't confuse me with facts; my mind is already made up." Most of us continue merrily to make our daily decisions without bothering to consider all the available relevant information.

The process of deciding is an important human behavior of high school students and their parents. And yet they have had very little directed, guided experience and almost no training in the deciding process.

Many counselors do not want to be "advice-givers" or merely to teach people to

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be "information users." And yet counseling, and most counseling training, is usually focused on the dynamics of personality adjustment and on individual personal problems. Consider the case of Lucy counseling with Charlie Brown (Schultz "Peanuts"). Lucy observed that Charlie looked rather depressed this particular day. Charlie admitted that this was true. Lucy then commented that she knew what was wrong. "The trouble with you, Charlie Brown, is that you're you," she said. "What in the world will I ever be able to do about that?" asked Charlie. Lucy, the counselor, responded, "I don't pretend to give advice -- I merely point out the problem."

The modern high school counselor providing guidance to students in the development of their plans for education beyond high school must do more than point out the problem or give advice. What the medical frontiersman needed, and what the secondary school counselor needs, and what the college counselor trainer needs is a coherent and comprehensive theory of guidance to give direction to their practice.

Decision-Making Theory Applied to College Planning

Parable: A man should never run after a bus, a woman, or a psychological theory -- another one will be along soon.

Although running after a theory for guidance and counseling may not be a very good procedure, waiting for another one to come along will not prove very fruitful either. The author has suggested that information and decision theory offers a compelling and coherent frame of reference for secondary school guidance (Gelatt, 1962). It follows the developmental theories of Super, Tiedeman and others. It provides direction for the following:

a. establishing objectives,

b. determining appropriate practices,

c. selecting areas of research,

d. evaluating progress toward these objectives.

Although it won't be necessary to go into detail about decision or game theory, some basic aspects should be mentioned in order to highlight the implications for counseling for college planning.

The general function of decision-making guidance is twofold: "It involves helping students make 'good' educational-vocational decisions and helping them develop effective decision-making skills." (Clarke, Gelatt, Levine, 1965, p. 40). Simply stated, the requirements of a good decision are:

a. adequate and relevant information,

b. an effective strategy for organizing, analyzing and synthesizing the information in order to arrive at a choice.

The information requirement involves knowledge of:

a. possible alternative actions,

b. possible outcomes,

c. probability of outcomes,

d. desirability of outcomes (preference, values).

Thus decision-making counseling occurs when the counselor helps the student estimate what actions are available, what outcomes will result if an action is pursued (or at least the probability of the outcome), and the relative importance of each outcome.

An Example of Decision-Making Guidance

A brief description of one example of a decision-making guidance program in the Palo Alto, California secondary schools may serve as an illustration. There are dangers in presenting such a quick "view" of parts of a program that took six years to develop, but other reports and publications give the complete details (Gelatt, 1962; Clarke & Gelatt, 1961 & 1962; Clarke, Gelatt & Levine, 1965; Gelatt & Clarke, in press; Clarke & Gelatt, in press; Yabroff, 1964; Yabroff, 1965).

This Palo Alto program is designed to help ninth and eleventh graders make their decisions about post-high school plans. It utilizes "experience tables" (rather than expectancy tables) which report the experience of other Palo Alto students going through high school and into post-high school activities. The grade point average was often the important variable used. The "experiences" of students are reported

as one out of ten, not as percentages, for simplification.

Table I is an example of such an experience table. This table shows the first-year post-high school activity of Palo Alto graduates according to ninth-grade grade point average. In deciding what to do after high school, students should be aware of the possible alternative actions and outcomes. Table I lists most of the possible alternatives. The ninth grade C+ student, for example, will discover that some students who had a similar grade point average in the ninth grade are to be found in every post-high school activity listed. Table I also provides some evidence of the probability of outcomes for certain types of students.

Another important decision facing ninth grade students is the selection of a high school academic load. Table II reports grades in special unit courses (academic courses beyond high school graduation requirements in foreign languages, college math, laboratory science, fourth year English). In deciding on an academic load for senior high school, students should know the possible outcomes (grades received is one important outcome). Table II shows how many former students attempted a certain number of special units and the outcomes in terms of grades received. Again, the present ninth grade student can get some evidence of the probability of outcomes (grades) from this table. Although there are important outcomes other than grades, to the extent that college recommending grades are a factor in choosing courses, this information is important. Table III is an experience table for special units in laboratory science.

Tables IV, V, and VI are designed to provide information about possible outcomes and probability of outcomes for students deciding on a college to attend.

The use of experience tables does not solve problems in post-high school guidance nor make decisions for students. However, such an approach does help to point out to students the need to consider many factors before making a choice. This is an attempt to organize and present relevant information to the decision-makers and to demonstrate a process of deciding.

Probabilities Linking Actions to Outcomes

Game theory (Luce and Raifa, 1957) divides the conditions in which decisions are made into four categories:

(1) certainty, in which each action is known to lead invariably to a specific outcome;

(2) risk, in which each action leads to one of a set of possible specific outcomes, each outcome occurring with a known probability;

(3) uncertainty, in which each action can lead to any one of a group of possible outcomes, but where the probabilities of these outcomes are completely unknown;

(4) combination of risk and uncertainty.

A student's decisions concerning college and other post-high school plans seem to be made under a combination of risk and uncertainty. That is, in most circumstances he cannot be certain that a particular action will lead to a particular outcome, but he can often obtain evidence upon which to base a rough estimate linking the two. Having knowledge about the alternatives, outcomes, and probabilities decreases the amount of uncertainty in the decision. Someone has said that "progress involves taking risks, for you can't steal home and keep one foot on third base."

Since each decision-maker has only partial control over any college or post-high school choice situation, it is important that he be aware of the conditions affecting his choice. The decision-maker must decide the best way of exercising the control he does have to bring about these outcomes which are more desirable and to avoid those which are less desirable. In other words, he must decide which among several alternative courses of action would be most likely to bring the results he desires.

Desirability of Outcomes

Obviously, if a student is to make decisions that will lead to desirable outcomes, he must know what outcomes are, to him, more desirable. A future outcome,

or experience, such as college, may have instrumental value in that it will lead to more long-range outcomes which are desirable. College may also have intrinsic value for a student in that getting in may be a goal itself or the learning experience there may be a self-satisfying outcome.

Now, a counselor can help a student examine the instrumental value of his college choice by helping him be aware of (see Clarke, Gelatt, Levine, 1965, p. 46):

a) the sequence of outcomes (experiences) leading from the outcomes (college),

b) the factors at each branch point in those experiences,

c) the probabilities associated with those factors,

d) the personal desirability of the long-range outcomes.

To help a student examine the intrinsic value of a college goal, a counselor would see that the student understands:

a) the nature of the future experience,

b) his own interests,

c) his own value system.

This means knowing something about the non-academic factors of the college and the nature of the student population. It also means that the student must know himself pretty well.

Expected Value Model

One theoretical model of choice behavior is the expected value model. According to this model, an individual, when faced with a choice between several alternatives, will select that action which has the highest expected value. The expected value of an action is the sum of the values (to the decision-maker) of the various outcomes. Decision-making, then, involves the weighing of alternatives in terms of their desirabilities and their likelihoods. A person would supposedly choose the action which led to the outcomes having the highest expected value when multiplying desirability by probability.

Translating this model to college choice seems easy. A student choosing a college would merely determine the personal value of certain college outcomes and weigh each value by its probability in order to make his decision. The expected value model, however, is a mathematical and economic model and involves objective probabilities and objective values (e.g. dollars and cents).

Planning your own high school future, on the other hand, involves a great deal of the subjective. Personal endeavor, ego-involvement, and arousal of achievement-related motives are all part of educational-vocational decision-making. Thus, decision-making guidance must take into account a student's affective and motivational reactions to success and failure and must consider the effect of social pressure on values.

Wendell Johnson (1946, p. 6) reminds us that "If not to succeed absolutely is to fail utterly, then to succeed absolutely becomes utterly important." What effect will such <u>personal pressure</u> have on students' decision-making?

And, as John Gardner (1961, p. 82) says, "If enough of the American people believe that one must attend college in order to be accorded respect and confidence, then the very unanimity of opinion makes the generalization true."

What effect will such <u>social pressure</u> have on students' decision-making? The extensive research and literature on level of aspiration and achievement motivation are highly relevant to the question of subjective estimates of probabilities and to the problem of the involvement of personal values in the process of deciding. It is not possible, and probably not necessary with this audience, to go into a discussion of this literature now. (See Gelatt & Clarke, in press.)

<u>Subjective Probability</u>

The experimental work on the decision process supports the notion that subjective probability estimates play a crucial role in decision-making. The full importance of this role and its relation to desirability are often overlooked. A person's estimate of probability is often biased by the desirability of the object itself. That is,

there is a tendency to perceive events which are more desirable as being more likely to occur than events which are less desirable. For example, a student who desires Harvard admittance very highly may perceive his probability of being admitted as more likely than objective data would suggest.

It is also interesting to note that desirability of a goal (the subjective value) is likewise influenced by its probability of attainment. That is, there is said to be a greater value, in America at least, placed on achievement of a goal that is difficult to get. For example, a student may desire Harvard admittance <u>because</u> it is selective and therefore difficult to achieve. An object that has low probability has high desirability.

Newer research is further suggesting that the amount and direction of bias in estimating probabilities may be in part a function of certain personality factors (Atkinson, 1957, 1960; Feather, 1963; Kogan & Wallach, 1964).

So when a student comes to a counselor for guidance in planning for college, we know that providing him with relevant information is not the whole story. <u>But it is an essential part of guidance</u>! When a student lacks sufficient objective information upon which to base his decision, guidance is falling short.

A student who estimates his probability of doing satisfactory work in any college to be close to zero may well not attempt college. It would be unfortunate if his estimate were based on inaccurate, subjective opinion without accurate, objective data.

"The counselor's job is to help students find alternatives, face facts, calculate odds, weigh values, establish priorities, and implement action. If it knew the possibilities and the odds, a sow's ear, instead of aspiring to be a silk purse might prefer to be a pigskin wallet." (Krumboltz, in press).

<u>The Role of Information and Values</u>

Guidance for college planning must begin with information, but it must continue into values. Good decision-making counseling brings you directly into a confrontation with values.

"If values are truly the major synthesizing element in decision-making; if they order, arrange, and unify the student's perceptions of traits and social forces; if they muster these perceptions for a particular decision or for a mode of choosing -- then indeed the student's exploration and examination of values must be of prime concern of guidance." (Katz, 1963, p. 17). It is the function of guidance, then, to escort the student beyond the data and into a profound and rational consideration of the meaning of the data for him. "Thus, we envision a pyramid of guidance needs, with availability of raw information standing as a prerequisite at the base of the heap and supporting the superstructure." (Katz, 1963, p. 46).

Because of this important role of personal values in decision-making the goodness of a decision cannot be evaluated on some arbitrary scale of realistic outcomes. Each possible outcome will have different value for different individuals. And the importance of success or the seriousness of failure will have different meaning for each individual. Therefore, a correct choice cannot be established; only the <u>way</u> in which a person chooses (the process) can be evaluated.

"The decision for each must be evaluated on a different scale of values. Since the student will make a particular choice only once, it is manifestly impossible to seek a strategy which is superior on the average, for the average has no meaningful definition. A particular decision must be evaluated on the basis of the expected outcome and its value for this individual." (Cronbach & Glesser, 1957).

Implications for Counselor Preparation

Since many have already spelled out counselor training needs, let me supply the more obvious implications of a decision-making guidance framework for the preparation of school counselors.

1. Less emphasis on traditional "clinical" techniques,
2. More emphasis on counseling as teaching,
3. Therefore, more attention to the principles of learning.
4. I would advocate, of course, teaching the principles of decision theory:

a. the role of information prerequisites,

b. the concept of risk, of expected return strategy, etc.

c. the preferences for various strategies,

d. the concept of probability,

e. the role of values.

5. Counseling about human values in decision-making suggests a new kind of individual interviewing, personal counseling;

6. Knowledge of vocational development theory and research;

7. Knowledge of statistical inference and data processing;

8. Knowledge of the adult world "to be": college entrance, vocational, economic, social, political, etc.

9. A study of such factors as level of aspiration, achievement motivation, and cognitive dissonance (or a person's capacity to deceive himself), communication process, etc.;

10. A re-emphasis on group guidance (a content of guidance to be taught);

11. Recognition of the need for in-service to supplement pre-service training.

Summary

1. I have suggested that decision theory offers the most promising comprehensive framework for guidance services for helping students in their post-high school plans.

   a. Post-high school planning requires a series of decisions along the way. Counselors are actually playing a role in this student decision-making process.

   b. Such a theoretical framework provides an appropriate and helpful basis for their operation and evaluation.

2. Lorraine Hansen (in College Board Review, Fall 1963) lists three basic characteristics of the student's decision-making for college:

   a. It is continuous;

b. It is tentative;

c. It is often more psychological than logical.

3. Mankind is said to be like passengers on a bus where all the seats are turned backward. They can't see where they are going but only where they have been. A decision-making theory of guidance requires that counselors help students analyze their past performances and the experiences of others like themselves as part of the process. It also requires that counselors help students look ahead into the adult world which the student will enter.

4. This is what decision theory says to guidance:

a. A study of previous experience,

b. An understanding of present conditions both within the individual and in the current environment,

c. An analysis and prediction of future outcomes (statement of expectation),

d. A synthesizing through personal values to a choice.

5. Woodring (1957) reminds us that a person's ability to choose, as well as his right to choose is the essence of freedom. How well he learns the skills involved in the process of choosing will determine his power of self-determination, his freedom of choice. The many post-high school educational opportunities for youngsters today are the "possibilities" of which Leona Tyler speaks. The limitations of choice now are not so much a lack of legal or personal freedom as a lack of knowledge or experience.

6. Counselors equipped with a decision-making framework and with knowledge about individual human behavior and the post-high school world can help students develop independent decision-making skills by assisting them in formulating relevant hypotheses about themselves and the post-high school world; by helping them become aware of appropriate ways of testing these hypotheses against both past and new experiences; and by helping the student to see the educational relevance of what he already knows, or will learn, about himself and his future education.

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TABLE I

FIRST YEAR ACTIVITIES OF PALO ALTO GRADUATES

1st Year Activities

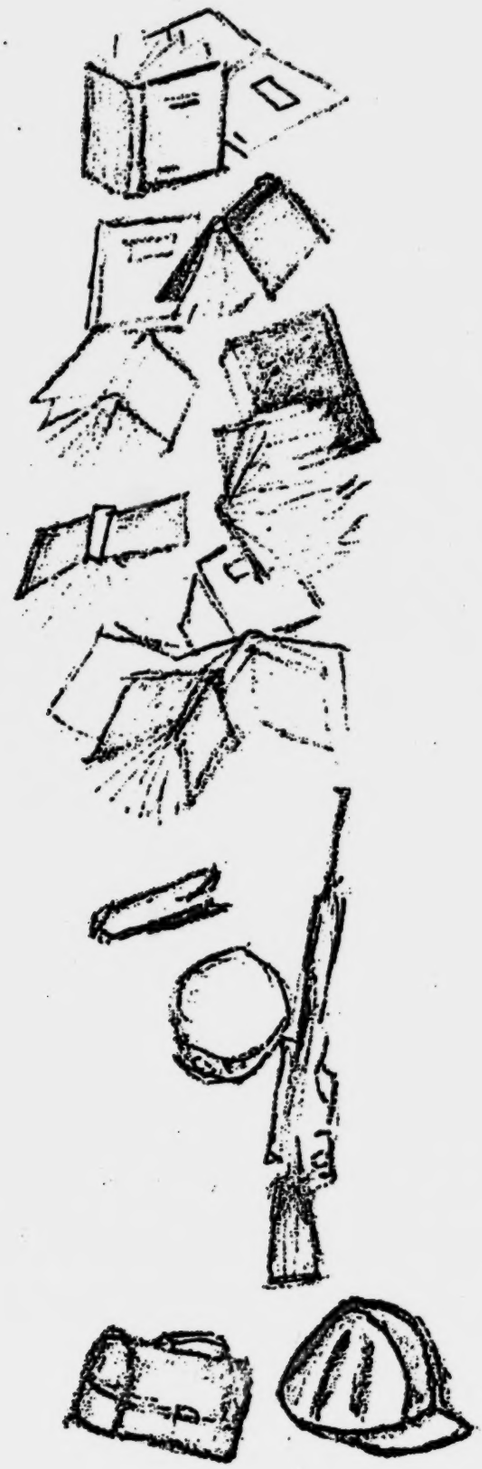
1st Year Activities	Below C	C	C+	B	A
IV - Colleges of Highest Entrance Requirements	0	0	-	1	3
III - Colleges of High Entrance Requirements	-	1	2	3	5
II - Colleges of Medium Entrance Requirements	-	2	3	3	1
I - Junior College	5	5	4	3	1
Technical School	-	-	-	-	-
Military Service	1	1	-	0	-
Employed	2	-	1	-	-
Married, Seeking Work	2	1	-	-	-

My 9th Grade Average

- = Less than 1 out of 10

FIRST YEAR ACTIVITIES OF PALO ALTO GRADUATES

1963 - 1964 Classes
87% of Graduates Contacted



8% entered Group IV Colleges -
Highest Entrance Requirements
(like Stanford)

19% entered Group III Colleges -
High Entrance Requirements
(like Oberlin)

20% entered Group II Colleges -
Medium Entrance Requirements
(like San Jose State)

37% entered Group I Colleges -
(like Foothill Junior College)

2% entered Technical Training Schools -
(like Automation Institute)

3% entered Military Service

9% entered Full Time Employment

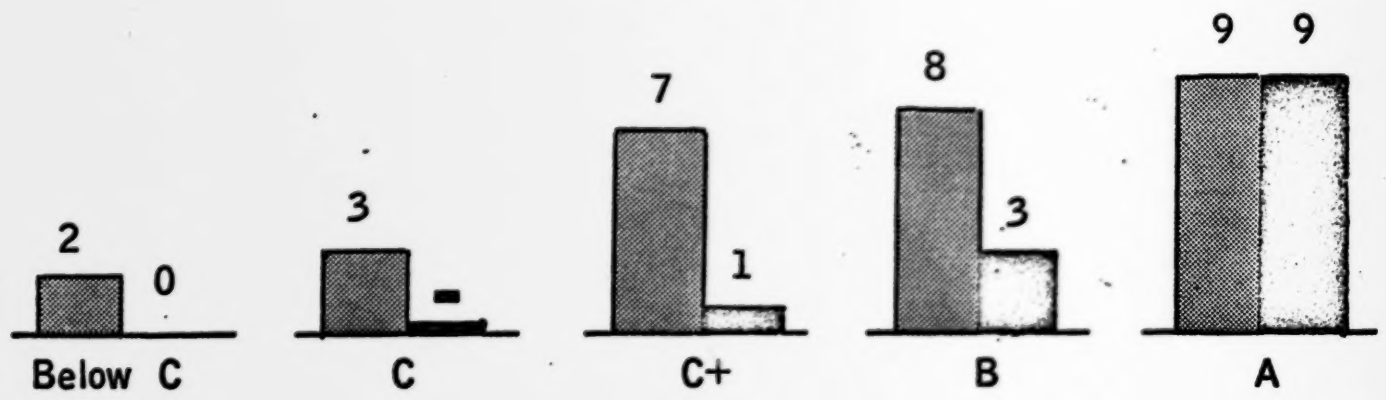
2% sought Employment, Married, Traveled, Etc.

TABLE II

GRADES EARNED IN SPECIAL UNIT COURSES

How well did former students do in the special unit courses that they took? For every 10 students who took

TWO TO FIVE



My 9th Grade Average

SIX or MORE

My 9th Grade Average

= Passed these courses with C or Better

= Earned B or Better (Recommending Grades for Group III & IV Colleges)

▬ = Less than 1 out of 10

TABLE III

GRADES EARNED IN LABORATORY SCIENCES

- A SPECIAL UNIT -

N=2296

Laboratory Science Grades	Below C	C	C+	B	A
A	0	-	1	2	5
B	0	1	1	2	3
C+	-	1	2	3	1
C	2	3	4	2	1
Below C	8	5	2	1	-

9th Grade Average

College Recommending Grades

TABLE IV

FIRST YEAR GRADES
SAN JOSE STATE

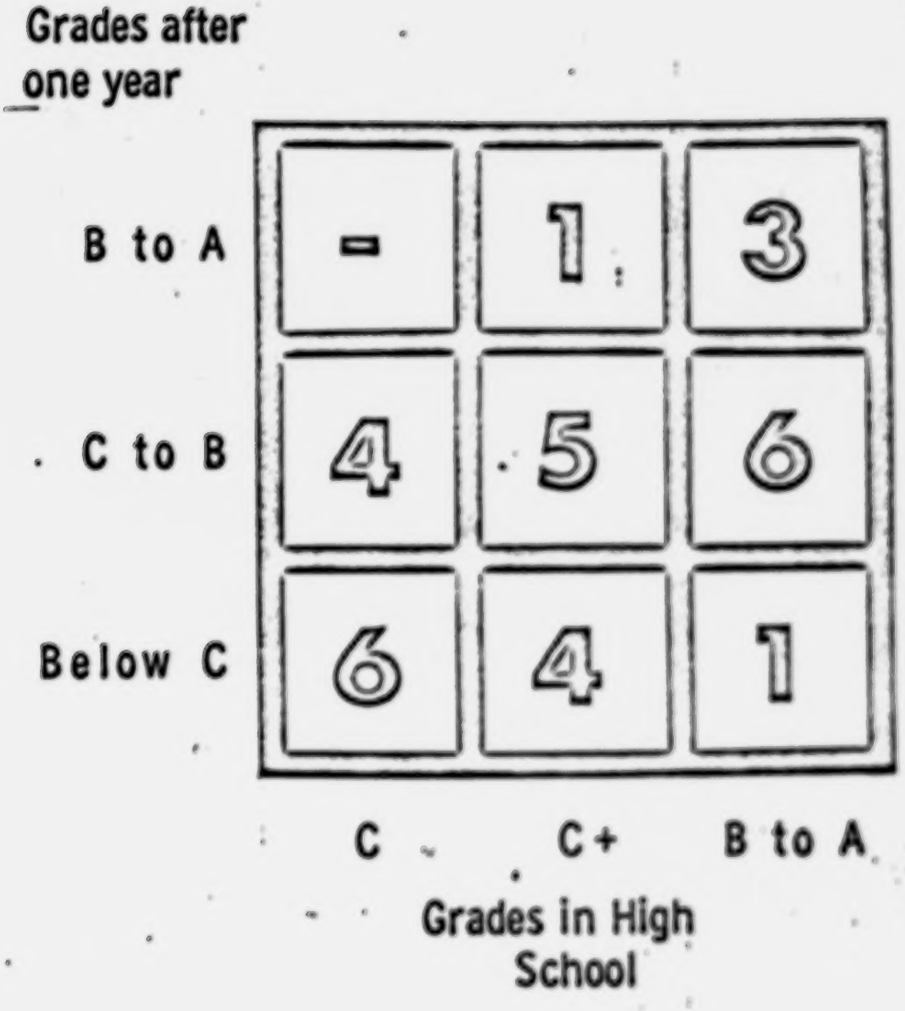


TABLE V

FIRST YEAR GRADES

STANFORD

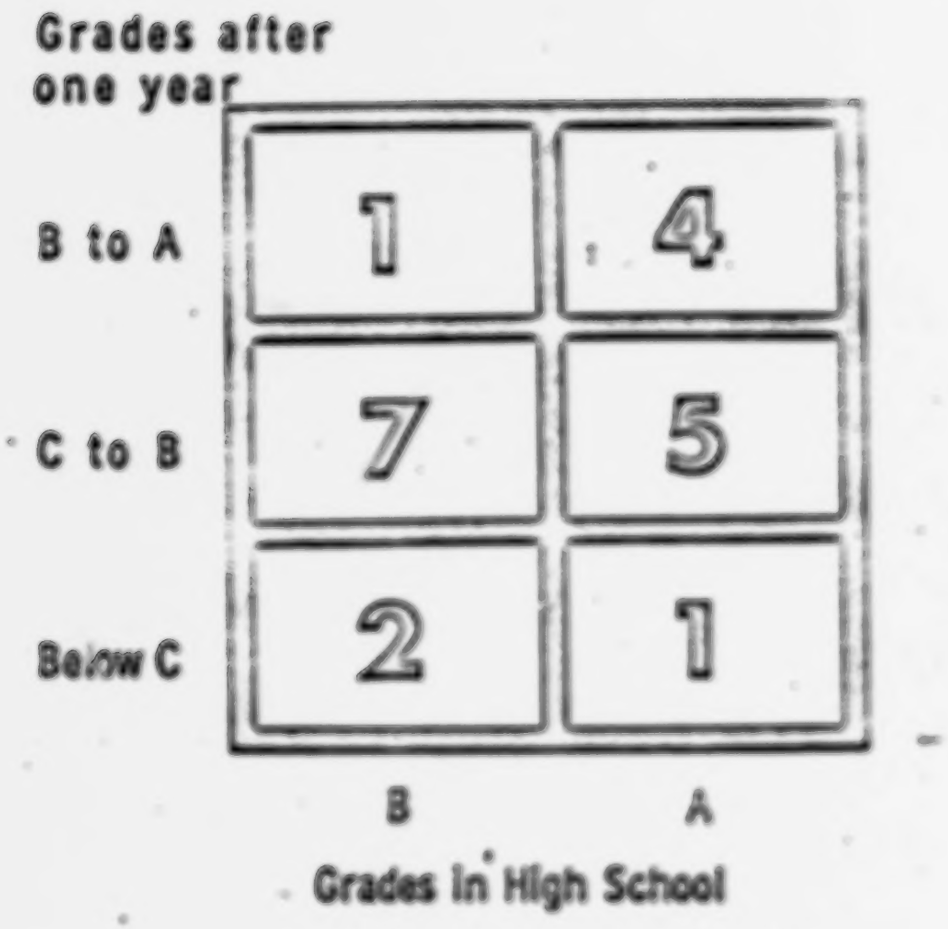
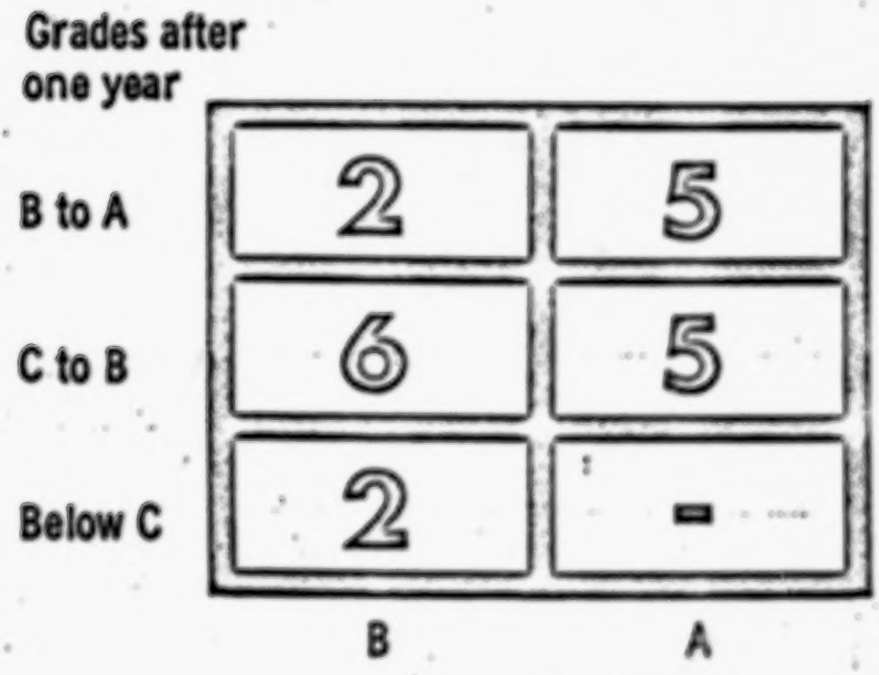


TABLE VI

FIRST YEAR GRADES AT

UNIV. OF CALIF., BERKELEY



UNIV. OF CALIF., ALL CAMPUSES